

LI. — Notes on *Ianthina*, *Bolten*; and Indication of a new Species of the allied oceanic Genus *Recluzia*, *Petit*. By W. H. BENSON, Esq.

AN examination of Reeve's Monograph of *Ianthina*, published in 1858, and of Mörch's "Matériaux pour servir à l'Histoire de la Famille des *Ianthines*," contained in the 'Journal de Conchyliologie' for the present year, has suggested a few observations with reference especially to the species in an extensive collection of pelagian shells made in 1834-35, during a voyage to Calcutta in the 'Malcolm.' My success in the construction of casting and towing nets of novel patterns, and the inspection of the curious forms captured, caused my example to be followed by other passengers in the ship; an opportunity was thus afforded for the examination of a larger number, and occasionally of finer specimens, of the shells obtained in my own nets, besides two genera which were missed by them.

The first *Ianthina* seen were accidentally enclosed in a casting net employed to procure specimens of the brilliant and active little *Glaucus Forsteri*, and proved to be a small variety of *Ianthina exigua*, Lamarck. This species was observed during two days before the island of Madeira was sighted. I succeeded in keeping the animal alive in sea-water for ten days. *Glaucus Forsteri* lived for a longer period, and was found to feed on its less active shell-bearing fellow-prisoners.

I. exigua was the most widely distributed species met with, occurring again near the equator, and continuing along the Brazilian portion of the Atlantic, towards the island of Tristan d'Acunha, where it attained a large size, as far as 39° of south latitude. Here it was again small; but a still larger variety, with a more rosy violet tint, appeared in the middle of the Southern Indian Ocean, north-east of the Isles of St. Paul and Amsterdam. Between this variety and *I. capreolata*, Montrouzier, I can find no sufficiently distinguishing character. Smaller specimens again occurred to the south of the equator, and at the head of the Bay of Bengal.

A small and delicate variety of *I. nitens*, Menke, made its appearance to the north of the Cape de Verde Islands. South of this group, the apical nucleus of the same species was taken; and in 6° of north latitude the shell was captured fully grown. The peculiarities of the spire and float will be noticed in another part of this paper.

In 14° north lat., south of the Cape de Verde Islands, a small shell, which I think must be the young of Reeve's *I. Smithia*, was found sparingly, as well as at the equator.

Between 4° and 5° of north lat., *I. planispirata*, Adams & Reeve

(agreeing rather with the shell figured in the Voyage of the 'Samarang' than with the very different form assigned to the species in pl. 2. f. 9. of the 'Iconica'), first occurred in company with *I. nitens*, and continued at intervals as far as 35° S. lat. and 74° E. long., generally with *I. exigua*. I had not the good fortune to catch such large specimens of this species as were taken by one or two of my companions.

About midway between Sierra Leone and Paraiba, 3° north of the line, and in about 24° of west longitude, we sailed during half an hour, on the 10th of October, through a space occupied by a fine species, the more depressed forms of which appear to be Lamarek's *I. fragilis* (not *I. fragilis*, Reeve). The spire is variously elevated, until in one specimen it attains the exact figure of Reeve's *I. affinis*, considered by Mörch to be merely a variety of *I. fragilis*. Nine specimens were captured, of which four fell to my net. Several fine ones were missed. This species was not again seen until, in the Bay of Bengal, to the north-east of the Andamans, I took in my casting-net eight specimens of a variety in an immature state. *Trochus Ianthinus*, the original species of Chemnitz, which has a similar elevated spire, is assigned to Tranquebar, on the Coromandel coast of the same bay.

The next form obtained was a beautiful little purple *I. umbilicata*, D'Orb., the finest specimens exhibiting an incision in the outer lip nearly as deep as that to which *I. bifida*, Nuttall, owes its name. From its locality (about a degree north of the line), until we had attained 14° of north latitude in the Bay of Bengal, it was not observed. I then took a single specimen of a large solid variety; and some minute examples accompanied *I. exigua* to the head of the bay.

As we approached the Tristan d'Acunha group, in the Southern Atlantic, we sailed for several days through a tract, from 30° S. lat. and 18° W. long. to 33° S. and 10° W., inhabited by a fine white and violet-coloured *Ianthina pallida*, Harvey, in company with a large variety of *I. exigua*. On the last day of its appearance we passed specimens of a very large size; but the rate (8 knots) at which the ship was sailing through a strong swell, caused the loss of my casting and towing nets in the attempts made to procure them. On the following day, when the weather had become favourable, not a single specimen of *I. pallida* was visible; and it did not again appear until we had reached a point to the north-east of the Isles of St. Paul and Amsterdam, where a small pale variety was accompanied by the *Ianthina* next to be noticed: the species then disappeared for the rest of the voyage.

From the 1st to the 5th of December, between 33° and 30° south latitude and 81° and 83° east longitude, the 'Malcolm'

sailed through a sea occupied by a large violet-blue species which varied in form, surface, and colour from the one named *Ianthina caruleata* by Reeve, towards that which he has figured under the name of *I. grandis*, the spire increasing gradually in elevation. Larger specimens than those which I took were got by my companions, and still larger shells were missed by my casting net, or were passed while it was thrown after other objects. Associated with this fine *Ianthina* were the curious slaty-blue *Lepas fascicularis*, Darwin, radiating from a common spongy float, and furnished with coriaceous instead of testaceous armour; great numbers of a small blue swimming crab, using the free floats of the *Ianthinae* as rafts, from which they darted on their prey, and returned to feed on it; a large kind of *Ianthina exigua*, and the little pale variety of *I. pallida*. The tract in question is about midway between Natal and Swan River.

Another species was a solitary shell taken west of the Island of Sumatra, about a degree north of the equator, and between 90° and 91° of east longitude. It appears to be a small variety of Mörch's *Ianthina Carpenteri*, figured in the 'Iconica' as *I. fragilis*. I omitted to take a note of the animal or of its float.

Between the neighbourhood of Madeira and the Sand Heads, at the mouth of the river Hooghly, I recorded the capture of *Ianthinae* on thirty-five days. On one occasion attempts were made to secure *I. pallida*, but without success; and we passed large specimens of it on a Sunday. On two other Sundays, we observed large *Ianthinae* which could not be identified in the water, nor guessed at, from their not appearing on the preceding or following days. Including *Hyalæa*, *Creseis*, *Cuvieria*, *Cleodora*, *Atlanta*, *Oxygyrus*, *Carinaria*, *Argonauta*, &c., shells entered our nets on sixty-seven days; and captures of small marine animals of some kind or other were made on seventy-five days,—a tolerable proof of the abundant employment afforded in a sailing voyage for a naturalist provided with suitable apparatus, when the numerous days on which, from various circumstances, nets were not used, are taken into consideration. Rapid progress and rough weather often prevented any attempt at fishing for several consecutive days, especially in the regions of the Trade-winds, and in the strong westerly gale which prevailed near the 40th degree of south latitude.

Reeve inadvertently states that the Atlantic and Pacific Oceans lay claim to all the *Ianthinae* that have been actually captured. The first species figured by him is, however, assigned to the Nicobar group in the Bay of Bengal; and his *I. Africana* is referred to Zanzibar, on the African shore of the Indian Ocean. Localities mentioned by Chemnitz and Krauss would also have helped

to prove a more extensive range for the known species of this ubiquitous genus.

I. exigua, Lamk.

Sketches were made, in different positions, of the animal taken near Madeira. Bunches of purple ovisacs adhered to the centre of all the floats, those towards the hinder extremity being flaccid and empty. When the float is broken off, the animal sets to work to supply its place in the mode described by Reynell Coates. A free float was captured with ovisacs attached, but without the shell and its inhabitant. The shell, from its small size and its position, is not visible in the water, but the float may be easily distinguished from the foam scattered from the bows of the ship, by its whiter appearance, resembling a minute flock of cotton, broad at one end and pointed at the other. No additional egg-sacs were deposited while the animals remained in confinement, although they continued to add to their floats. There are flexible cilia to the mouth; when the snout is extruded, these are extended and agitated with great rapidity, apparently in the search for food.

Confined with *Glaucus Forsteri*, *I. exigua* became the prey of the more active Mollusk; and portions of the *Ianthinæ*, hardly changed, were voided from a small papilla situated between the second and third branchiated fins of *Glaucus*, on the same side as the conspicuous organ of generation.

The tentacula of *I. exigua* are elongate-conical, not subulate as in Rang's figure of *I. violacea*?; and the apophyses, which he describes as ocular pedicles, are larger and broader in proportion than in his species, emulating the tentacula in size. Mörch places Rang's shell in the subgenus *Achates*, while *I. exigua* is included in *Iodina*. It is highly probable that a critical examination and dissection of the animals will establish generic differences among the *Ianthinæ*. An opportunity occurs on our own shores for comparing those which are brought to the western portions of the British Islands by the Gulf-Stream.

All the varieties of *I. exigua* from the Atlantic and the eastern seas presented a more rounded base than the British specimen figured by Reeve, which was probably imperfect in that part. The emargination of the outer lip is very variable in perfect specimens, some of the Madeiran and south-eastern shells exhibiting an incision nearly as deep as that observable in *I. bifida*. The Madeiran type has a bluer tint than the more southern forms. There is a greater or less tendency to perforation in all the varieties—a feature which appears to have been overlooked. The apex is more or less developed; and the paler band round the suture is present in some specimens, and deficient in others, from the same locality.

M. Montrouzier has omitted to state on what special grounds he proposed to separate *I. capreolata* as a species. Mörch has accepted it without question; but in none of the recorded characters, whether in respect to general form, subperforation, colouring, depth of the marginal sinus, form of columella and base, carination, structure of apical nucleus, or bifariate sculpture, does any distinctive character from *I. exigua* appear to be discoverable. The shell from the South-eastern Archipelago may be reckoned as the largest known variety. That from the vicinity of St. Paul varies much in figure, one specimen having the breadth equal to the length; others present the usual shape.

I. nitens, Menke.

This shell, of a uniform translucent purple colour, with a polished surface, only entered my towing net of a small size, my largest specimen being 7 mill. in length. I have, however, recorded the capture by one of my companions of fine examples with their floats, which were carinate above, and composed of large globules. No ovisacs were found attached to them. This variety is distinguished from the shell figured by Reeve by its somewhat depressed spire. The nuclei, which were taken on one occasion, are of a pale greyish violet, with a large rounded aperture, the columella not being elongated as in the more advanced state of growth.

I. Smithiæ, Reeve.

Having taken only two minute specimens of the shell, supposed from its form and colours to be the young of this species, I have neglected to record any particulars respecting the float or animal.

I. planispirata, Adams and Reeve.

My largest specimen of this shell is only $9\frac{1}{2}$ mill. in diameter; but one of my fellow-passengers took a large one, unprovided with ovisacs, but with a perfect float, which I noted as being elongate and convex, the globules composing it being large, oblong, and transversely disposed. I have remarked that the floats may always be referred to the species to which they belong, when once observed in attachment to a shell, each kind having its peculiar form and mode of construction; therefore in separating species it is of great moment to attend to the float; and it is desirable that this part should be preserved in a dried state.

It is quite sufficient to glance at the representation (pl. 11. fig. 10) in the Voyage of the 'Samarang,' to see that the fig. 9 of plate 2 in the 'Iconica' has no manner of resemblance to it, having a wide depressed-conoid spire with rapidly increasing whorls, instead of the depressed plano-convex spire with slowly

increasing whorls of the true species. The chief character of the "discoïd" *I. planispirata* consists, according to the original description, in "its narrow depressed mode of convolution," of which Reeve's figure No. 9 exhibits no appearance, the body of the shell in the latter exceeding in magnitude the area of the aperture, whereas in the 'Samarang' figure the aperture is larger than the body of the shell. Mörch refers Reeve's figure to *I. planispirata* as "var. γ . grandis," without further remark.

A. Adams says nothing of the sculpture. All my specimens are sculptured with undulate and radiate striæ, which are more closely packed and more sharply plicate on the basal portion. Mörch refers *I. planispirata* to the subgenus *Iodes*, Leach, the animal of which is stated to be viviparous.

I. fragilis, Lam. (including the variety *I. affinis*, Reeve).

The violet colour of the under side of the shell was visible in the water through the float, and assisted to distinguish it from the foam. The float was of strong texture, and was composed of large transverse polyhedrous globules arranged in a convex form on the surface exposed to the air; one proved to be dichotomous, evidently from some accident. The cilia within the animal's mouth were stiff and prickly. Mörch includes the species in the subgenus *Achates*, Gistel, recorded as being oviparous. Our specimens were destitute of ovisacs; whether in consequence of the season for their reaching maturity having passed, and of the animals having provided themselves with fresh floats, or from their being permanently deficient in those appendages, cannot be asserted. As soon as the water in which the specimens were placed for examination was changed, a quantity of beautiful carmine fluid ejected spoiled it, and all died on the following day, some of them casting off their shells, when the animal, including the spiral portion, remained attached to the float at the surface of the water. A gummy coat, which was easily rubbed off while the shell was wet, dried into a moderately polished surface.

The dimensions of four examples are as follow, tending to corroborate Mörch's suggestion regarding *I. affinis*, Reeve:—

	Long.	Lat.	
Specimen resembling <i>I. affinis</i>	22½	25½	mill.
Approximate form	21	25	„
Depressed variety	19	24	„
Smallest specimen	17½	20	„

The last approaches in form Rang's figure, which Mörch refers, as a variety, to *I. violacea*, Bolten.

Respecting the younger examples of the variety taken in the Bay of Bengal, I only noted the number of individuals captured.

This shell has a more shining surface, and a more convex conoid outline, with a somewhat impressed suture. Mörch considers *I. roseola*, Reeve, found a few degrees further south, near the Nicobars, to be another variety of the type attributed by Chemnitz to the same Gulf.

I. umbilicata, D'Orb.

Mörch seems to have been in doubt regarding Reeve's figure. Although he cites it without comment among the synonyms of D'Orbigny's shell, yet, under the head of *I. globosa*, he had quoted it as the probable young of that species. *I. umbilicata* is referred by Mörch to the subgenus *Iodina*, one of the characters of which is the incised labrum. No trace of this is to be observed in Reeve's figure No. 22, from a shell in Mr. Cuming's collection, nor is it alluded to in the description. The conclusion to be derived from its appearance in the plate is that it was drawn from a broken shell, the want of correspondence between the right lip and the bifariate striæ at the periphery being obvious. I have already noticed the deep incision observable in the beautiful and perfect examples from the Atlantic. There is a silky lustre on the surface, which causes the shell to approach in polish nearly to *I. nitens*, from which the different character of the base and the general form of the shell distinguish it. A pale band is observable round the suture; and in the large solid variety of the Bay of Bengal, which attains 10 millim. in length, there is also a pale band at the angular periphery. I can find no note of the animal or ovisacs of this species in my journals.

I. pallida, Harvey.

The floats are circular and spiral when in good condition; but occasionally the sutural adhesion is lost, and the float, partially uncurling, assumes a semilunar form. The pendant cells of eggs are about the size and shape of small apple-pips, rough, and at first pink, but in a more advanced state purplish brown. Independent floats, provided with egg-cells, were also procured; and all the shells with perfect floats were similarly endowed. If Reynell Coates's observations really had reference to *I. globosa*, Swanson, and not to *I. pallida*, the floats of the former shell must be similar in spiral construction to those which I found attached to the latter.

The rounded base of the columella is not adverted to by Reeve in his description of *I. pallida*. It constitutes the character of the section *Amethystina*, Gistel, on which its separation from *I. globosa* and its allies is grounded.

Four out of six specimens of the Southern Atlantic form present a feeble lustre and a spiral sulcate striation, while the other two are deficient in sulcation and are covered with a peculiar

bloom devoid of lustre. Of the former, three are pale externally, the violet tinge being more vivid within the aperture near the outer lip; the fourth is altogether of a violet tint, more saturated within the aperture. Of the two shells with a dull surface, one is suffused with violet, the other is paler at the upper part. My largest specimen is 18 mill. in length by 11 in breadth. Others were procured of a greater size. Specimens stated to be from the coast of Portugal exhibit a bluer tint than the rosy violet of the southern shell.

I. cæruleata, Reeve, and var.

In colour this shell was found to vary from that of *I. cæruleata*, Reeve, to that of *I. grandis* of the same author, and in form from *I. cæruleata* in the depressed type, through *I. communis*, R. (which, according to Mörch, is a variety of *I. bicolor*, Costa), towards *I. grandis*, the perfect form and full size of which Mörch affirms that *I. bicolor* attains occasionally. Of seven specimens, taken chiefly in my casting net, I retain five, the largest of which is 29 mill. in height and 33 mill. in diameter. In my journal, under date 2nd Dec. 1834, in 32° 26' S. lat. and 82° 21' E. long., I noted that I had missed some very large specimens at which I had thrown my net.

Mörch places *I. bicolor* (as *I. Costæ*, Mörch) and *I. cæruleata*, R., in the viviparous subgenus *Iodes*, Leach, while he includes *I. grandis*, R., in the oviparous subgenus *Achates*. The float of my species (under whatever name it may be retained) had a plane surface, and one side was thicker than the opposite edge. It was composed of large transverse bubbles. None of the specimens had egg-cells attached; but numerous large floats procured with them, and which, almost beyond question, belonged to the same species, were found bearing egg-cells, as noted in my journal on the 2nd and 3rd of December. The shells were taken daily, from the 1st to the 5th of that month; and as the *Ianthina* which accompanied them belonged to a little variety of *I. pallida*, and to *I. exigua*, the small size of those shells and the very different formation of their floats precluded the assignment of the large egg-bearing floats to those species. More shell-less floats were observed than those which bore shells.

The animal was dark blue, with the exception of the whitish tentacula, and it gave out a purple fluid which stained the nets with a greenish colour. The white basal band in the specimens which resemble *I. cæruleata* gives place in one conoid specimen to a pinkish-violet band; and in others the whole base is of a uniform deep-violet tint, which gradually fades into opaque white towards the summit of the spire. The sculpture is more or less rough in different individuals. The right lip is rather deeply

emarginate. Further observations are necessary to decide whether an obtuse or acute periphery is a sufficient character to enable us to pronounce an opinion on the viviparous or oviparous habit of a species. I may here remark that on one day *I. pallida* was taken without egg-cells, while two days after, the same species was provided with them,—a circumstance unfavourable to arguments derived from the negative character in other species.

Ianthina incisa, Philippi, has been overlooked by Mörch in his list of synonyms. It was described in the 'Zeitschrift für Malak.' for 1848. The character attributed to the suture is found both in *I. Carpenteri*, Mörch, and *I. fragilis*, Lamarck. Great stress is laid on the depth of the emargination of the labrum; but this is so variable in other species, that it cannot be relied on alone for specific distinction.

Recluzia, *Petit*.

Two species of this Ianthid are figured in the 'Journ. de Conch.' for 1853; a third species, figured by Adams, is supposed by Mörch to be *R. turrita*, V. d. Busch, described by Philippi as an *Ianthina* in the 'Zeitschrift' for 1848 (not 1847, as stated by Mörch). A shell found by Bennett in his whaling voyage, near the Kingsmill group, to the east of New Ireland, and which he names, without a description, *Ianthina lutea*, undoubtedly belongs to this genus. In a line of sea-drift, he says, "*Ianthinæ* were the most abundant of the floating Mollusks. Their number was immense, and their floats contributed greatly to the white appearance of the froth-line. One species of this family was new to me, and is certainly very rare; its shell was yellow, rather smaller and more elongated than *I. communis*, and the whorl more prominent and spiral. The contained animal was also of a yellow colour, but in the form of its float and in other respects it closely resembled the ordinary blue-shelled species*."

The species of *Recluzia* of which the habitats are recorded come from Mazatlan, in Mexico, and the Arabian Gulf. Two specimens of a small shell, which must evidently be classed with this genus, and differing from any species described, were captured in a towing net by one of my fellow-passengers, abreast of the opening between the Great and Little Nicobar, and about sixty miles to the west of it. Unfortunately he had cleared out the animals and thrown them away before informing me next day of his acquisition; and I was only able to note that it was a new, horn-coloured, shining, turreted shell, pointed at the base of the aperture, and with a sinus above the angular base towards

* Narrative of a Whaling Voyage, by F. D. Bennett, F.R.G.S., 1833-1836 (published in 1840); *vide* vol. ii. pp. 62, 63, and Appendix, p. 298.

the columella. In size it was equal to *Bithynia ventricosa*. Pieces of drift-wood, vegetating seeds, shells of *Spirula*, a small *Litiopa*, *Hyalæa*, *Loligopsis*, and one of the venomous sea-snakes of the Bay, with a keeled belly, black above and yellow below, and with a broad white zigzag line running along the laterally compressed tail, entered our towing nets on that night, borne by the tidal currents through the group of islands.

Mörch rejects Jeffreys's *Recluzia aperta* from the genus, and refers it to *Amauropsis*. The aspect of the shell is opposed to the supposition of its being a floating pelagian form.

Cheltenham, Oct. 19, 1860.

LII.—On a new Genus and some new Species of Mollusca from Japan. By ARTHUR ADAMS, F.L.S., &c.

Genus CINGULINA, A. Adams.

Testa subulato-turrita. Anfractus numerosi, cingulis elevatis spiralibus instructi, interstitiis sculptis. Apertura oblonga, antice integra; labio recto, simplici; labro acuto, arcuato.

This genus most nearly resembles *Monoptygma* in form and sculpture; but in the straight inner lip and absence of parietal fold it is like *Turbonilla*. The transverse ridges of the whorls likewise suggest *Aclis*, but the form of the aperture is very different. I have found the typical species (described below) both in the north of China and in the Sea of Japan.

Cingulina circinata, A. Adams.

C. testa subulato-turrita tenui, alba, opaca; anfractibus normalibus circa 11, planiusculis, cingulis spiralibus tribus, interstitiis longitudinaliter concinne striatis; anfractu ultimo cingulis quatuor instructo, basi convexo, liris spiralibus elevatis ornato.

Hab. Awa-Sima; in shell-sand. Loo-shan-Kou (Shan-tung); in shell-sand.

Genus PARTHENIA, Lowe.

Since writing my papers containing descriptions of new species of *Parthenia*, *Odostomia*, *Dunkeria*, &c., I have continued to investigate these interesting though somewhat diminutive forms, and am now enabled to record several additional species.

1. *Parthenia spirata*, A. Adams.

P. testa ovato-conica, tenui, sordide alba, rimata; anfractibus normalibus 4, spiratis, longitudinaliter costatis, costis rectis subdi-stantibus, interstitiis lirulis obsolete decussatis, suturis canaliculatis, costis in anfractu ultimo (basi liris convergentibus ornato)